

10/529,461

(FILE 'HOME' ENTERED AT 15:31:00 ON 26 MAY 2007)

FILE 'REGISTRY' ENTERED AT 15:32:13 ON 26 MAY 2007

L1 STRUCTURE UPLOADED

=> d l1

L1 HAS NO ANSWERS

L1 STR

Structure diagram not available for display

Structure attributes must be viewed using STN Express query preparation.

=> s l1

SAMPLE SEARCH INITIATED 15:32:35 FILE 'REGISTRY'

SAMPLE SCREEN SEARCH COMPLETED - 366 TO ITERATE

100.0% PROCESSED 366 ITERATIONS

43 ANSWERS

SEARCH TIME: 00.00.01

FULL FILE PROJECTIONS: ONLINE **COMPLETE**

BATCH **COMPLETE**

PROJECTED ITERATIONS: 6173 TO 8467

PROJECTED ANSWERS: 467 TO 1253

L2 43 SEA SSS SAM L1

=> s l1 full

FULL SEARCH INITIATED 15:32:40 FILE 'REGISTRY'

FULL SCREEN SEARCH COMPLETED - 6739 TO ITERATE

100.0% PROCESSED 6739 ITERATIONS

780 ANSWERS

SEARCH TIME: 00.00.01

L3 780 SEA SSS FUL L1

=> fil caplus

COST IN U.S. DOLLARS

SINCE FILE

TOTAL

ENTRY

SESSION

FULL ESTIMATED COST

172.10

172.52

FILE 'CAPLUS' ENTERED AT 15:32:46 ON 26 MAY 2007

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FILE COVERS 1907 - 26 May 2007 VOL 146 ISS 23

FILE LAST UPDATED: 25 May 2007 (20070525/ED)

Effective October 17, 2005, revised CAS Information Use Policies apply.

They are available for your review at:

<http://www.cas.org/infopolicy.html>

=> s 13

L4 1203 L3

=> s 14 and py<2002

21897330 PY<2002

L5 766 L4 AND PY<2002

=> s 15 and catalyst

763857 CATALYST

L6 712 L5 AND CATALYST

=> s 16 and polymerization

346666 POLYMERIZATION

L7 688 L6 AND POLYMERIZATION

=> s 17 and olefin#

158791 OLEFIN#

L8 445 L7 AND OLEFIN#

=> s 18 and substituted fluorenyl

498746 SUBSTITUTED

4332 FLUORENYL

116 SUBSTITUTED FLUORENYL

(SUBSTITUTED(W) FLUORENYL)

L9 18 L8 AND SUBSTITUTED FLUORENYL

=> d 1-18 bib abs

L9 ANSWER 1 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:823367 CAPLUS

DN 135:358360

TI Olefin polymerization catalysts and their use in
manufacture of olefin polymers

IN Hasegawa, Saiki; Maehama, Seiji; Sato, Morihiko

PA Tosoh Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 18 pp.

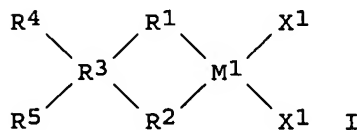
CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------|------|----------|-----------------|--------------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 2001316415 | A | 20011113 | JP 2000-142303 | 20000510 <-- |
| PRAI | JP 2000-142303 | | 20000510 | | |
| OS | MARPAT 135:358360 | | | | |
| GI | | | | | |



AB The catalysts giving high-quality polymers in high productivity, comprise
(a) transition metal compds. I [M1 = Zr, Hf; X1 = H, halo, C1-20
hydrocarbyl optionally containing O, N, or Si, C1-20 alkoxy, C1-20 alkylamide;
R1 = (un)substituted cyclopentadienyl, (un)substituted indenyl; R2 =

(un)substituted indenyl, (un)substituted fluorenyl; R3 = C, Si, Ge; R4, R5 = C1-20 hydrocarbyl optionally containing O, N, or Si, C1-20 alkoxy, C1-20 alkylamide, wherein R4 and/or or R5 is C6-20 aryl optionally containing O, N, or Si], (b) modified clay compds., (c) organic Al compds., and (d) Ti compds. Optionally, the catalysts are brought into contact with (d) organic Al compds. The polymers are manufactured by

polymerizing

R16CH:CHR17 (R16, R17 = H, C1-14 alkyl; R16 and R17 may be bonded to form ring) in the presence of the catalysts in a solution, dispersion, or gas state at -60° to 300° and 0.5-2000 bar. Thus, 1-hexene and ethylene were polymerized in the presence of diphenylmethylenecyclopentadienyl(9-fluorenyl)zirconium dichloride, dimethylaniline HCl salt-modified Kunipia F (montmorillonite), triethylaluminum, and bis(cyclopentadienyl)titanium dichloride to give a polymer having melt flow rate 2.31 g/10 min.

L9 ANSWER 2 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:823366 CAPLUS

DN 135:358359

TI Olefin polymerization catalysts and their use in manufacture of olefin polymers

IN Hasegawa, Ayaki; Maehama, Seiji; Sato, Morihiko

PA Tosoh Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 22 pp.

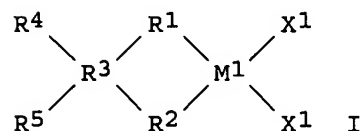
CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------|------|----------|-----------------|--------------|
| PI | JP 2001316414 | A | 20011113 | JP 2000-142302 | 20000510 <-- |
| PRAI | JP 2000-142302 | | 20000510 | | |
| OS | MARPAT 135:358359 | | | | |
| GI | | | | | |



AB The catalysts giving high-quality polymers in high productivity, are obtained by bringing catalyst components containing (a) transition metal compds. I [M1 = Zr, Hf; X1 = H, halo, C1-20 hydrocarbyl optionally containing O, N, or Si, C1-20 alkoxy, C1-20 alkylamide; R1 = (un)substituted cyclopentadienyl, (un)substituted indenyl; R2 = (un)substituted indenyl, (un)substituted fluorenyl; R3 = C, Si, Ge; R4, R5 = C1-20 hydrocarbyl optionally containing O, N, or Si, C1-20 alkoxy, C1-20 alkylamide, wherein R4 and/or or R5 is C6-20 aryl optionally containing O, N, or Si], (b) modified clay compds., and (c) organic Al compds. into contact with reaction products of (d) particle supports with (e) Ti compds. and optionally (f) organic Al compds. The polymers are manufactured by polymerizing

R16CH:CHR17 (R16, R17 = H, C1-14 alkyl; R16 and R17 may be bonded to form ring) in the presence of the catalysts in a solution, dispersion, or gas state at -60° to 300° and 0.5-2000 bar. Thus, 1-hexene and ethylene were polymerized in the presence of diphenylmethylenecyclopentadienyl(9-fluorenyl)zirconium dichloride, dimethylaniline HCl salt-modified Kunipia F (montmorillonite), triethylaluminum, and a product [prepared by reacting titanocene dichloride with AgClO4 and then Li taeniolite] to give a polymer having melt flow rate 2.96 g/10 min.

L9 ANSWER 3 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
 AN 2001:427394 CAPLUS
 DN 135:33735
 TI Process for producing syndiotactic/isotactic block polyolefins using a metallocen catalyst
 IN Razavi, Abbas
 PA Fina Technology, Inc., USA
 SO U.S., 9 pp., Cont.-in-part of U.S. 6,184,326.
 CODEN: USXXAM
 DT Patent
 LA English
 FAN.CNT 4

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------------------|------|----------|-----------------|--------------|
| PI | US 6245870 | B1 | 20010612 | US 1995-474955 | 19950607 <-- |
| | US 5476914 | A | 19951219 | US 1992-854150 | 19920320 <-- |
| | US 6184326 | B1 | 20010206 | US 1995-459575 | 19950602 <-- |
| | CA 2178411 | A1 | 19961208 | CA 1996-2178411 | 19960606 <-- |
| | CA 2178411 | C | 20070410 | | |
| | EP 747406 | A1 | 19961211 | EP 1996-109097 | 19960606 <-- |
| | EP 747406 | B1 | 19981007 | | |
| | R: BE, DE, ES, FR, GB, IT, NL | | | | |
| | ES 2123316 | T3 | 19990101 | ES 1996-109097 | 19960606 <-- |
| | JP 09136930 | A | 19970527 | JP 1996-168260 | 19960607 <-- |
| | JP 3683040 | B2 | 20050817 | | |
| PRAI | US 1992-854150 | A1 | 19920320 | | |
| | US 1995-379828 | B2 | 19950127 | | |
| | US 1995-459575 | A2 | 19950602 | | |
| | US 1988-220006 | B2 | 19880715 | | |
| | US 1995-474955 | A | 19950607 | | |

OS MARPAT 135:33735

AB The invention provides a metallocene catalyst for use in preparing syndiotactic/isotactic block polyolefins. The catalyst comprises a bridged metallocene in which one of the cyclopentadienyl rings is substituted in a substantially different manner from the other ring and the cyclopentadienyl rings have lack of bilateral or pseudo-bilateral symmetry. The catalyst comprises a metallocene compound generally described by the formula R'-(C5R4)(C4R'4C5C4R'4)MeQp wherein (C5R4) = substituted cyclopentadienyl ring; (C4R'mC5C4R'n) = fluorenyl ring or substituted fluorenyl ring; each R and R' = H or C1-20 hydrocarbyl radical, a halogen, an alkoxy, and alkoxy alkyl or an alkylamino radical, each R and R' may be the same or different; (C5R4) has a lack of bi-lateral symmetry; R' is a structural bridge between the (C5R4) and (C4R'4C5C4R'4) rings to impart stereorigidity and, preferably, is a hydrocarbyl biradical having at least one C atom to form the bridge; Q is a hydrocarbyl radical, such as an alkyl, aryl, alkenyl, alkylaryl or arylalkyl radical having 1-20 carbon atoms or is a halogen; Me is Group IIIB, IVB, VB, or VIB metal as positioned in the Periodic Table of Elements; and p is the valence of Me minus 2. This catalyst is syndio-/iso-specific and produces a syndiotactic/isotactic block polymer.

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 4 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
 AN 2001:283966 CAPLUS
 DN 134:296247
 TI Metallocene compounds as olefin polymerization catalysts and manufacture of metallocene catalysts and polyolefins
 IN Kawai, Koji; Yamashita, Masahiro; Tohi, Yasushi; Kawahara, Nobuo; Michiue, Kenji; Kaneyoshi, Hiromu; Mori, Ryoji
 PA Mitsui Chemicals, Inc., Japan
 SO PCT Int. Appl., 352 pp.
 CODEN: PIXXD2

DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------------------|------|----------|-----------------|--------------|
| PI | WO 2001027124 | A1 | 20010419 | WO 2000-JP6945 | 20001005 <-- |
| | W: CN, JP, KR, SG, US | | | | |
| | RW: BE, DE, FR, GB, IT, NL | | | | |
| | EP 1138687 | A1 | 20011004 | EP 2000-964684 | 20001005 <-- |
| | EP 1138687 | B1 | 20070411 | | |
| | R: BE, DE, FR, GB, IT, NL | | | | |
| | US 6939928 | B1 | 20050906 | US 2001-857687 | 20010608 |
| | US 2005228155 | A1 | 20051013 | US 2005-54597 | 20050210 |
| PRAI | JP 1999-288838 | A | 19991008 | | |
| | JP 1999-288839 | A | 19991008 | | |
| | JP 1999-288840 | A | 19991008 | | |
| | JP 2000-250387 | A | 20000821 | | |
| | JP 2000-250390 | A | 20000821 | | |
| | JP 2000-250391 | A | 20000821 | | |
| | WO 2000-JP6945 | W | 20001005 | | |
| | US 2001-857687 | A3 | 20010608 | | |

OS MARPAT 134:296247

AB A metallocene compound, for use as an olefin polymerization catalyst for providing isotactic polymers, has a substituted cyclopentadienyl and a (substituted) fluorenyl ligands which have been bridged with a hydrocarbon group. A process for producing the metallocene compound is intended to selectively produce the specific metallocene compound while avoiding the generation of an isomer by synthesizing isomer-free intermediates. Polyolefin produced by using a catalytic system including the metallocene compound is excellent in impact resistance and transparency and has isotacticity >85%.

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 5 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:592729 CAPLUS

DN 133:177641

TI metallocene catalysts for olefin polymerization

IN Razavi, Abbas

PA Fina Research S.A., Belg.

SO PCT Int. Appl., 55 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|----|---|------|----------|-----------------|--------------|
| PI | WO 2000049029 | A1 | 20000824 | WO 1999-EP1094 | 19990219 <-- |
| | W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IN, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| | AU 9931411 | A1 | 20000904 | AU 1999-31411 | 19990219 <-- |
| | JP 2002510358 | T | 20020402 | JP 1999-512835 | 19990219 |
| | CA 2371835 | A1 | 20000824 | CA 2000-2371835 | 20000218 <-- |
| | WO 2000049056 | A1 | 20000824 | WO 2000-EP1378 | 20000218 <-- |
| | W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM | | | | |

RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE,
DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF,
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

EP 1169356 A1 20020109 EP 2000-906358 20000218
EP 1169356 B1 20040714

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
IE, SI, LT, LV, FI, RO

BR 2000008312 A 20020122 BR 2000-8312 20000218
US 6515086 B1 20030204 US 2000-506943 20000218
AT 271071 T 20040715 AT 2000-906358 20000218
RU 2244721 C2 20050120 RU 2001-124801 20000218
ES 2223460 T3 20050301 ES 2000-906358 20000218

PRAI WO 1999-EP1094 A 19990219
US 1999-121753P P 19990226
WO 2000-EP1378 W 20000218

OS MARPAT 133:177641

AB A metallocene catalyst for use in preparing polyolefins having a monomer length $\leq C10$ has the following general formula:
 $R''(CpR1R2R3)(Cp'R1'R2')MQ2$ where Cp is a substituted or unsubstituted cyclopentadienyl ring; Cp' is a substituted fluorenyl ring; R'' is a bridge imparting stereorigidity; R1 is optionally a substituent on the cyclopentadienyl ring which is distal to the bridge, comprises a bulky group of the formula XR^*3 in which X is from Group IVA, and each R* is chosen from H or C1-20 hydrocarbyl, and R2 is optionally a substituent on the cyclopentadienyl ring. This ring is proximal to the bridge and positioned non-vicinal to the distal substituent YR#3, in which Y is from group IVA, and R# is chosen from H or C 1-7 hydrocarbyl; R3 is optionally a substituent on the cyclopentadienyl ring which is proximal to the bridge and is a H atom or is $ZR\$3$, in which Z is from group IVA, and each R\$ is chosen from H or C 1-7 hydrocarbyl. Each R1' and R2' are substituent groups on the fluorenyl ring, one of which is a group $AR'''3$, in which A is chosen from Group IVA, and each R''' is independently H or C 1-20 hydrocarbyl and the other is H or a second group of the formula $AR'''3$; M is a Group IVB transition metal or vanadium; and each Q is H or C 1-20 hydrocarbyl.

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 6 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:244764 CAPLUS

DN 132:251559

TI Metallocene-based catalysts for olefin polymerization and manufacture of catalysts

IN Zhang, Ying; Qu, Bo; Yao, Hui; Wang, Xi

PA China Petrochemical Corp., Peop. Rep. China

SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 10 pp.

CODEN: CNXXEV

DT Patent

LA Chinese

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|--------------|
| PI | CN 1211579 | A | 19990324 | CN 1997-116451 | 19970918 <-- |
| | CN 1098284 | B | 20030108 | | |
| PRAI | CN 1997-116451 | | 19970918 | | |

OS MARPAT 132:251559

AB An olefin polymerization catalyst system is composed of metallocene compound $BLL'MX2$ as main catalyst, supported aluminoxanes, and an organoaluminum compound [B = SiRR', GeRR', CRR', SiRR'OSiRR'; M = Ti, Zr, Hf; X = alkyl, halogen; L, L' = (substituted) cyclopentadienyl, (substituted) indenyl, (substituted) fluorenyl; R, R' = linear lower alkyl]. The mole ratio of Al in aluminoxanes to M in $BLL'MX2$ is 30-2,000, and that of Al in organoaluminum compound to M in $BLL'MX2$ is 30-200. The catalyst system is prepared

by baking the catalyst support at 200-800° for 1-24 h in N₂, treating at 50-200° in vacuum for 1-24 h, adding aluminoxanes and solvent, stirring at 30-80° for 1-10 h, washing with solvent, drying in vacuum to obtain co-catalyst, adding main catalyst and solvent, and allowing to complex at 0-40° for 0.3-2 h. Polypropylene and ethylene-1-hexene copolymer were prepared by using the catalyst system.

L9 ANSWER 7 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:12684 CAPLUS

DN 132:64654

TI Metallocene olefin polymerization catalyst

IN Razavi, Abbas; Peters, Liliane

PA Fina Research S.A., Belg.

SO Eur. Pat. Appl., 17 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|--------------|
| PI | EP 969019 | A1 | 20000105 | EP 1998-112233 | 19980702 <-- |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| | WO 2000001736 | A1 | 20000113 | WO 1999-EP4504 | 19990630 <-- |
| | W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW | | | | |
| | RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG | | | | |
| | AU 9949026 | A | 20000124 | AU 1999-49026 | 19990630 <-- |
| | EP 1155050 | A1 | 20011121 | EP 1999-932756 | 19990630 <-- |
| | EP 1155050 | B1 | 20070214 | | |
| | R: BE, DE, DK, ES, FR, GB, IT, NL, SE, PT, FI | | | | |
| | JP 2000034315 | A | 20000202 | JP 1999-189248 | 19990702 <-- |
| | US 6410476 | B1 | 20020625 | US 1999-346881 | 19990702 |
| | US 6630546 | B1 | 20031007 | US 2002-104745 | 20020322 |
| | US 6653431 | B1 | 20031125 | US 2002-104306 | 20020322 |
| PRAI | EP 1998-112233 | A | 19980702 | | |
| | WO 1999-EP4504 | W | 19990630 | | |
| | US 1999-346881 | A3 | 19990702 | | |

OS MARPAT 132:64654

AB A metallocene catalyst R'(CpRm)(Cp'R'n)MQ2 is used in the production of linear low d. polyolefin, where Cp is cyclopentadienyl and Cp' is (un)substituted fluorenyl; R' is a structural bridge imparting stereorigidity; R is H or C1-20-hydrocarbyl in which $0 \leq m \leq 4$; R' is C1-20-hydrocarbyl in which $0 \leq n \leq 8$; M is Group IVB transition metal or vanadium; and Q is C1-20-hydrocarbyl or halogen; the metallocene has a centroid-M-centroid angle 105°-125°.

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 8 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 1999:407115 CAPLUS

DN 131:59254

TI Manufacture of norbornene random copolymers with high glass transition temperature

IN Yamaguchi, Masayoshi; Takimoto, Kazuyuki

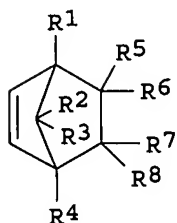
PA Mitsui Chemicals Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 13 pp.

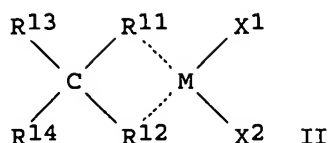
CODEN: JKXXAF

DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|------------------|------|----------|-----------------|--------------|
| PI | JP 11171918 | A | 19990629 | JP 1997-341042 | 19971211 <-- |
| PRAI | JP 1997-341042 | | 19971211 | | |
| OS | MARPAT 131:59254 | | | | |
| GI | | | | | |



I



II

AB Title polymers with glass transition temperature $\geq 160^\circ$ are manufactured by polymerization of C2-20 α -olefins and >60 mol% of ≥ 1 norbornenes I [R1-R8 = H, halo, hydrocarbyl; R5-R8 may form (double bond-containing) monocyclic group; R5 and R6, or R7 and R8 may form alkylidene] in the presence of catalysts comprising (A) transition metal compds. II [M = Ti, Zr, Hf; R11, R12 = (un)substituted cyclopentadienyl, (un)substituted indenyl, (un)substituted fluorenyl; R13, R14 = C1-10 alkyl, C6-10 aryl, C2-10 alkenyl, C7-40 arylalkyl, C7-40 alkylaryl, C8-40 arylalkenyl; X1, X2 = C1-20 (halogenated) hydrocarbyl, O-, S-, or Si-containing group, H, halo], (B) organoaluminumoxy compds. and/or compds. forming ion pairs with A, and optionally (C) organoaluminum compds. Thus, ethylene and norbornene were polymerized in the presence of isopropylidene(cyclopentadienyl)(indenyl)zirconium dichloride, Me aluminoxane, and triisobutylaluminum to give a copolymer showing intrinsic viscosity 0.68 dL/g (at 135° , in decalin) and glass transition temperature 174° .

L9 ANSWER 9 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
AN 1999:142418 CAPLUS
DN 130:210113

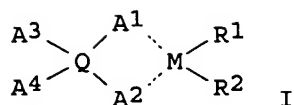
TI Chloroprene copolymers having low-temperature and solvent resistance and their manufacture

IN Mashiko, Yoshihiro; Arai, Susumu; Shiono, Takeshi
PA Denki Kagaku Kogyo K. K., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------|------|----------|-----------------|--------------|
| PI | JP 11060638 | A | 19990302 | JP 1997-214327 | 19970808 <-- |
| | JP 3420916 | B2 | 20030630 | | |
| | JP 2003238613 | A | 20030827 | JP 2003-30569 | 20030207 |
| | JP 3781728 | B2 | 20060531 | | |
| PRAI | JP 1997-214327 | A3 | 19970808 | | |
| OS | MARPAT 130:210113 | | | | |
| GI | | | | | |



AB Title copolymers comprising C2-10 olefin units and 2-chloro-1,3-butadiene units and having weight-average d.p. 10-100,000 are manufactured in the presence of transition metals I (A1, A2 = (un)substituted cyclopentadienyl, (un)substituted (benzo)indenyl, (un)substituted fluorenyl, A3, A4 = H, C1-10 alkyl, C6-20 aryl, alkylaryl, arylalkyl, haloaryl, etc., Q = C2-10 hydrocarbon, Si-, Ge-, or Sn-containing C1-10 hydrocarbon, etc.; R1, R2 = halo, H, C1-10 alkyl, alkylaryl, arylalkyl, etc.; M = Zr, Ti, Hf) and catalyst promoters. Thus, 10.5 mL chloroprene and 5 kg/cm² ethylene was polymerized at 40° in the presence of diphenylmethylene(cyclopentadienyl)(fluorenyl)zirconium dichloride and MMAO 3A (methylalumoxane) to give a polymer showing weight-average d.p. 1530, glass transition temperature -58°, and good solvent resistance.

L9 ANSWER 10 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:732363 CAPLUS

DN 128:13524

TI Ultrahigh-molecular-weight ethylene polymers, their powders, and their manufacture

IN Yamada, Satoru; Sato, Morihiko

PA Tosoh Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|--------------|
| PI | JP 09291112 | A | 19971111 | JP 1996-105515 | 19960425 <-- |
| PRAI | JP 1996-105515 | | 19960425 | | |

AB The polymers, having (a) viscosity-average mol. weight (Mv) ≥1,000,000 and (b) Mw/Mn ≤3, are manufactured by (co)polymerization of ethylene and optionally, ≥C3 α-olefins using catalysts containing mainly metallocene compds. of R1XYM1R42 [R1 = X and Y linking aryl-containing hydrocarbon group, silanediyl, germanediyl; X = cyclopentadienyl; Y = (un)substituted fluorenyl C4H4-mR2mC5C4H4-nR3n; R2, R3 = C1-20 hydrocarbyl, amino, O-containing hydrocarbyl, halo; M1 = Ti, Zr, Hf; R4 = H, C1-20 hydrocarbyl, amino, O-containing hydrocarbyl, halo; m = 0-4]. Thus, polymerization of ethylene in the presence of (iso-Bu)3Al and diphenylmethylene(cyclopentadienyl)(2-dimethylaminofluorenyl)zirconium dichloride (supported by dimethylaniline hydrochloride-treated montmorillonite) gave a polymer showing Mv 17.5 x 10⁵, Mw/Mn 2.5, average particle size 210 μm, and bulk d. 0.35 g/cm³.

L9 ANSWER 11 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 1997:195673 CAPLUS

DN 126:186525

TI Metallocene polymerization catalyst for olefins

IN Imuta, Junichi; Yoshida, Masayasu; Tohi, Yasushi

PA Mitsui Petrochemical Industries, Ltd., Japan

SO Eur. Pat. Appl., 56 pp.
CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|-----------------|--------------|
| PI | EP 754698 | A2 | 19970122 | EP 1996-305215 | 19960716 <-- |
| | EP 754698 | A3 | 19970129 | | |
| | R: DE, FR, GB, IT, NL | | | | |
| | SG 64939 | A1 | 20020219 | SG 1996-10300 | 19960617 |
| | CA 2181307 | A1 | 19970118 | CA 1996-2181307 | 19960716 <-- |
| | US 6004897 | A | 19991221 | US 1996-683068 | 19960716 <-- |
| | CN 1156728 | A | 19970813 | CN 1996-108293 | 19960717 <-- |
| | JP 09235313 | A | 19970909 | JP 1996-187563 | 19960717 <-- |
| | JP 3506563 | B2 | 20040315 | | |
| | US 6297333 | B1 | 20011002 | US 1999-315268 | 19990520 <-- |
| PRAI | JP 1995-180178 | A | 19950717 | | |
| | JP 1995-180179 | A | 19950717 | | |
| | JP 1995-300323 | A | 19951117 | | |
| | JP 1995-300324 | A | 19951117 | | |
| | JP 1995-344258 | A | 19951228 | | |
| | JP 1995-344259 | A | 19951228 | | |
| | US 1996-683068 | A3 | 19960716 | | |
| OS | MARPAT 126:186525 | | | | |
| AB | An olefin polymerization catalyst (supported or unsupported) comprises (A-1) a Group IVB transition metal compound formed by the reaction of transition metal compound with a substituted indenyl-substituted fluorenyl bridging compound, and (B) (B-1) an organoaluminum oxy-compound, and/or (B-2) a compound which reacts with the transition metal compound (A-1) to form an ion pair, wherein, inter alia, ≥ 1 R1 is aryl, arylalkyl, arylalkenyl or alkylaryl or 2 R1s from a ring. Thus, C2H4 and 1-octene were polymerized in the presence of Me aluminoxane 0.4, triisobutyl aluminum 1.0, and dimethylsilylene (2-methyl-4,5-benzo-1-indenyl) (2,7-di-tert-butyl-9-fluorenyl)zirconium dichloride 0.002 mmol to give a copolymer having melt flow rate 0.21 g/10 min. and d. 0.898 g/cm ³ . | | | | |

L9 ANSWER 12 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
AN 1997:174939 CAPLUS
DN 126:172044
TI Syndiospecific metallocene adducts as catalysts for olefin polymerization
IN Cui, Chunming; Chen, Wei; Hong, Xiaoyu; Jing, Zhenhua; Deng, Jingbo
PA China Petrochemical Corp., Peop. Rep. China; Fushun Research Institute of Petroleum Processing, Sinopec
SO Ger. Offen., 7 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|------------------|--------------|
| PI | DE 19627662 | A1 | 19970116 | DE 1996-19627662 | 19960709 <-- |
| | DE 19627662 | C2 | 20030821 | | |
| | CN 1140720 | A | 19970122 | CN 1995-107482 | 19950714 <-- |
| | CN 1061994 | B | 20010214 | | |
| | JP 09048810 | A | 19970218 | JP 1996-183887 | 19960712 <-- |
| | JP 3192090 | B2 | 20010723 | | |
| PRAI | CN 1995-107482 | A | 19950714 | | |
| OS | MARPAT 126:172044 | | | | |
| AB | The metallocenes Ar ₂ C(Cp-9-flu)MQ ₂ .RXR'.NM'Q ₂ /n [Ar = aryl group; Cp = (substituted) cyclopentadienyl group; Flu = (substituted) fluorenyl group; M = Group IVB metal; M' = alkali or alkaline earth metal; R, R' = alkyl; Q = halogen, alkyl, alkoxy, aromatic group, heterocyclic group; X = O or S] are stable and useful as catalysts in the syndiosp. polymerization of olefins. Adding 30.7 mmol etherial PhLi to 30.7 mmol fluorene in THF and then adding 30.7 mmol diphenylfulvene gave 51% ligand Ph ₂ C(Cp-9-flu), reaction of which (5.0 mmol) with 10 mmol BuLi in Et ₂ O-hexane at room temperature followed by addition of ZrCl ₄ gave 3.1 g | | | | |

Ph₂C(Cp-9-flu)ZrCl₂.Et₂O.2LiCl (I). Polymerization of C₃H₆ in PhMe containing
50 mg I and 2 g Me aluminoxane at 1 atm for 3 h gave 5.2 g polypropylene with
syndiotacticity >80%, m.p. 107°, weight-average mol. weight 220,000, and
polydispersity 2.

L9 ANSWER 13 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
AN 1997:90430 CAPLUS
DN 126:104552
TI Process for producing syndiotactic/isotactic block polyolefins using a
metallocene catalyst
IN Razavi, Abbas
PA Fina Technology, Inc., USA
SO Eur. Pat. Appl., 13 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 4

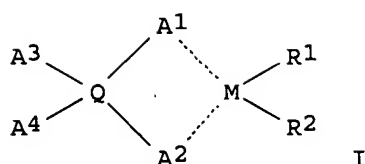
| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------------------|------|----------|-----------------|--------------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | EP 747406 | A1 | 19961211 | EP 1996-109097 | 19960606 <-- |
| | EP 747406 | B1 | 19981007 | | |
| | R: BE, DE, ES, FR, GB, IT, NL | | | | |
| | US 6245870 | B1 | 20010612 | US 1995-474955 | 19950607 <-- |
| PRAI | US 1995-474955 | A | 19950607 | | |
| | US 1992-854150 | A1 | 19920320 | | |
| | US 1995-379828 | B2 | 19950127 | | |
| | US 1995-459575 | A2 | 19950602 | | |

OS MARPAT 126:104552
AB The catalyst comprises a metallocene compound generally described
by the formula R₂(C₅R₄)(C₄R₁4C₅R₁₄)Me_Qp wherein (C₅R₄) is a substituted
cyclopentadienyl ring; (C₄R₁4C₅R₁₄) is a fluorenyl ring or
substituted fluorenyl ring; each R and R₁ is hydrogen or
hydrocarbyl radical having from 1-20 carbon atoms, a halogen, an alkoxy,
and an alkoxy alkyl or an alkylamino radical, each R and R₁ may be the
same or different; (C₅R₄) has a lack of bilateral symmetry; R₂ is a
structural bridge between the (C₅R₄) and (C₄R₁4C₅R₁₄) rings to impart
stereorigidity and, preferably, is a hydrocarbyl biradical having at least
one carbon atom to form the bridge; Q is a hydrocarbyl radical, such as an
alkyl, aryl, alkenyl, alkylaryl or arylalkyl radical having 1-20 carbon
atoms or is a halogen; Me is a Group IIIB, IVB, VB, or VIB metal as
positioned in the Periodic Table of Elements; and p is the valence of Me
minus 2. This catalyst is syndio-/iso-specific and produces a
syndiotactic/isotactic block polymer.

L9 ANSWER 14 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
AN 1995:974024 CAPLUS
DN 124:177218
TI Novel transition metal compounds for polymerization of
olefins with improved efficiency and polymerization of
olefins using them
IN Inoe, Norihide; Jinno, Masahiro; Shiomura, Tetsunosuke
PA Mitsui Toatsu Chemicals, Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------|------|----------|-----------------|--------------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 07247309 | A | 19950926 | JP 1994-40268 | 19940311 <-- |
| | JP 3392205 | B2 | 20030331 | | |
| PRAI | JP 1994-40268 | | 19940311 | | |
| OS | MARPAT 124:177218 | | | | |

GI



AB Th compds. consist of I [A1 = (substituted) cyclopentadienyl, (substituted) indenyl, (substituted) saturated or partially saturated indenyl, (substituted) fluorenyl, (substituted) saturated or partially saturated fluorenyl; A2 = alkylsilyl-substituted mono- or di-substituted fluorenyl; A3-4 = C1-10 alkyl, C6-20 aryl, alkylaryl, aralkyl, halogenated aryl, alkoxyaryl, hydrocarbyl containing heteroatom (such as O, N, S, Si, etc.), H; Q = C atom connecting A1 and A2, C2-10 hydrocarbyl, hydrocarbyl containing Si, Ge, or Sn; A3 and A4 may be connected and A3, A4, and Q may form a ring; R1-2 = halo, H, C1-10 alkyl, C6-20 aryl, alkylaryl, arylalkyl; M = Ti, Zr, Hf], and olefins are polymerized in the presence of I and catalyst aids. Propylene was polymerized in the presence of diphenylmethylene(cyclopentadienyl)[2,7-bis(trimethylsilyl)fluorenyl]zirconium dichloride and Me aluminoxane to give syndiotactic polypropylene.

L9 ANSWER 15 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN

AN 1994:701582 CAPLUS

DN 121:301582

TI Catalyst and process for (co)polymerizing alpha-olefins

IN Luciani, Luciano; Milani, Federico; Gila, Liliana; Ballato, Evelina

PA Enichem S.P.A., Italy

SO Eur. Pat. Appl., 7 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|--------------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | EP 595390 | A1 | 19940504 | EP 1993-202907 | 19931019 <-- |
| | EP 595390 | B1 | 19980715 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE | | | | |
| | AT 168384 | T | 19980815 | AT 1993-202907 | 19931019 <-- |
| | HU 66385 | A2 | 19941128 | HU 1993-2984 | 19931021 <-- |
| | US 5529966 | A | 19960625 | US 1993-138980 | 19931021 <-- |
| | CA 2109156 | A1 | 19940501 | CA 1993-2109156 | 19931025 <-- |
| | CZ 287777 | B6 | 20010117 | CZ 1993-2255 | 19931025 <-- |
| | JP 06199925 | A | 19940719 | JP 1993-270411 | 19931028 <-- |
| | RU 2119386 | C1 | 19980927 | RU 1993-49608 | 19931028 <-- |
| | FI 9304790 | A | 19940501 | FI 1993-4790 | 19931029 <-- |
| | BR 9304428 | A | 19940705 | BR 1993-4428 | 19931029 <-- |
| PRAI | IT 1992-MI2491 | A | 19921030 | | |

OS MARPAT 121:301582

AB An extremely active catalyst in the (co)polymerization of ethylene and other α -olefins contains $\text{Cp1Cp2M}(\text{NR1R2})(\text{NR3R4})$ [I, Cp1, Cp2 = (C1-4-alkyl-substituted) cyclopentadienyl, (C1-4-alkyl-substituted) indenyl, or (C1-4-alkyl-substituted) fluorenyl, Cp1 optionally linked to Cp2 by C atom or alkylsilanic bridge, M = Group IVB metal, R1, R2, R3, R4 = C1-8 alkyl, C5-8 cycloalkyl, or Ph] and an aluminoxane co-catalyst. Thus, 14.43 bar ethylene was polymerized 1 h at 70° in 1900 mL hexane in the presence of 0.5 bar H, 0.00752 g I (Cp1 = Cp2 = cyclopentadienyl, R1 = R2 = R3 = R4 = Et, M = Zr), and 40

mL 10% PhMe-oligomeric Me aluminoxane solution to give polymer at 34.4 kg/g catalyst.

L9 ANSWER 16 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
AN 1994:580449 CAPLUS
DN 121:180449
TI Catalyst and process for polymerizing alpha-olefins
IN Milani, Federico; Luciani, Luciano; Pivotto, Bruno; Labianco, Antonio
PA Enichem S.p.A., Italy
SO Eur. Pat. Appl., 9 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|--------------|
| PI | EP 588404 | A2 | 19940323 | EP 1993-202524 | 19930828 <-- |
| | EP 588404 | A3 | 19940824 | | |
| | EP 588404 | B1 | 19970618 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE | | | | |
| | CA 2095507 | A1 | 19941105 | CA 1993-2095507 | 19930504 <-- |
| | CA 2095507 | C | 20060725 | | |
| | CA 2104634 | A1 | 19940316 | CA 1993-2104634 | 19930823 <-- |
| | SK 280679 | B6 | 20000612 | SK 1993-911 | 19930826 <-- |
| | AT 154618 | T | 19970715 | AT 1993-202524 | 19930828 <-- |
| | ES 2105081 | T3 | 19971016 | ES 1993-202524 | 19930828 <-- |
| | CZ 288579 | B6 | 20010711 | CZ 1993-1826 | 19930903 <-- |
| | FI 9303923 | A | 19940316 | FI 1993-3923 | 19930908 <-- |
| | FI 112369 | B1 | 20031128 | | |
| | JP 06184216 | A | 19940705 | JP 1993-225913 | 19930910 <-- |
| | BR 9303781 | A | 19940614 | BR 1993-3781 | 19930914 <-- |
| | HU 66777 | A2 | 19941228 | HU 1993-2601 | 19930914 <-- |
| | HU 212438 | B | 19960628 | | |
| | RU 2118329 | C1 | 19980827 | RU 1993-52696 | 19930914 <-- |
| | US 6127305 | A | 20001003 | US 1996-725696 | 19961003 <-- |
| PRAI | IT 1992-MI2125 | A | 19920915 | | |
| | US 1993-107302 | B1 | 19930817 | | |

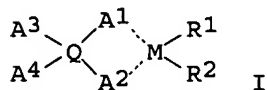
OS MARPAT 121:180449

AB An active catalyst in the polymerization of alpha-olefins is obtained by bringing a dialkylmagnesium or an alkyl magnesium halide into contact with a silicon or tin halide in solution in an inert organic solvent until a granular solid ppts. off, suspending this solid precipitate in an inert organic solvent, and bringing this precipitate into contact with CpCp1MRR1

[Cp, Cp1
= (C1-4-alkyl-substituted) cyclopentadienyl, (C1-4-alkyl-substituted) indenyl, or (C1-4-alkyl-substituted) fluorenyl, (Cp may be linked to Cp1), R, R1 = halo, C1-10 alkyl, or aryl, M = Group IVB element] for ≥ 0.5 h at Mg-M atomic ratio 1:(1-10,000) and 0-100°. Thus, ethylene was polymerized in hexane in the presence of oligomeric Me aluminoxane, H, and butyloctylmagnesium-SiCl4-supported bis(cyclopentadienyl)zirconium dichloride to give polymer at 0.85 kg/g catalyst.

L9 ANSWER 17 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
AN 1994:165223 CAPLUS
DN 120:165223
TI Catalysts for polymerization of olefins
IN Inoe, Norihide; Jinno, Masahiro; Shiomura, Tetsunosuke
PA Mitsui Toatsu Chemicals, Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

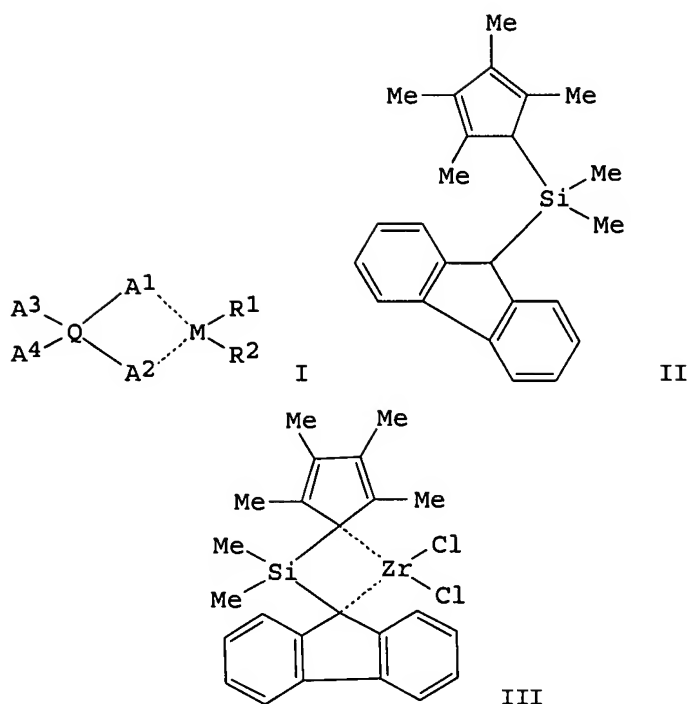
| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------|------|----------|-----------------|--------------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 05140221 | A | 19930608 | JP 1991-309115 | 19911125 <-- |
| PRAI | JP 1991-309115 | | 19911125 | | |
| OS | MARPAT 120:165223 | | | | |
| GI | | | | | |



AB Olefins are polymerized without using aluminoxane in the presence of catalysts comprising (A) transition metal compds. I [A1 = tetrasubstituted cyclopentadienyl; A2 = (substituted) fluorenyl; A3-A4 = H, C1-10 alkyl, C6-20 (alkyl)aryl, arylalkyl, haloaryl, hydrocarbyl containing heteroatoms; Q = C1-10 = hydrocarbyl connecting A1 with A2, hydrocarbyl containing Si, Ge, Sn, where A3, A4, and Q may form cyclic structure by connecting A3 and A4; R1, R2 = halogen, H, C1-10 alkyl, C6-20 (alkyl)aryl, arylalkyl; M = Ti, Zr, Hf], (B) organic Al compds., and (C) compds. stabilizing transition metal cations. Thus, 0.75 dm³ propylene was polymerized in the presence of dimethylsilylene(tetramethylcyclopentadienyl)(9-fluorenyl)zirconium dichloride 3.0, AlEt₃, and triphenylcarbeniumtetrakis(pentafluorophenyl) borate 6 mg at 40° for 1 h to obtain polypropylene with isotactic triad ratio 0.15, syndiotactic triad ratio 0.38, intrinsic viscosity 1.89 dL/g (Tetralin, 135°), and polydispersity 2.5, and catalyst activity 352 kg-polymer/g-Zr-h.

L9 ANSWER 18 OF 18 CAPLUS COPYRIGHT 2007 ACS on STN
 AN 1993:603635 CAPLUS
 DN 119:203635
 TI Preparation of transition metal complexes
 IN Inoe, Norihide; Jinno, Masahiro; Shiomura, Tetsunosuke
 PA Mitsui Toatsu Chemicals, Japan
 SO Jpn. Kokai Tokkyo Koho, 7 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|-------------------|------|----------|-----------------|--------------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 05059077 | A | 19930309 | JP 1991-215740 | 19910828 <-- |
| PRAI | JP 1991-215740 | | 19910828 | | |
| OS | MARPAT 119:203635 | | | | |
| GI | | | | | |



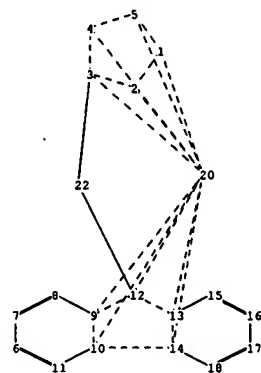
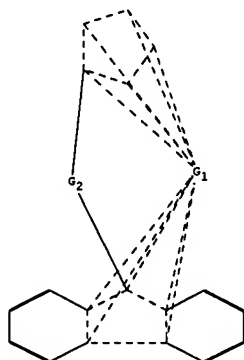
AB Transition metal complexes [I; A1 = tetrasubstituted cyclopentadienyl; A2 = (substituted) fluorenyl; A3, A4 = H, C1-10 alkyl, C6-20 aryl, aralkyl, alkylaryl, haloaryl, hydrocarbyl containing O, N, S, or Si hetero atom; O = C1-10 hydrocarbyl linking A1, A2, or hydrocarbylsilyl, -germyl, -stannyl; A3A4O may form a ring, etc.; R1, R2 = H, halo, C1-10 alkyl, C6-20 aryl, alkylaryl, aralkyl; M = Ti, Zr, Hf], useful as cocatalysts for manufacture polyolefins, are prepared A solution of fluorenyl

Na in

THF was treated with tetramethylcyclopentadienyldimethylchlorosilane at room temperature to give fluorenylsilane derivative II, which was dissolved in

THF,

treated with BuLi, THF was distilled, and the solid was rinsed with pentane to give II.2Li salt, which was dissolved in CH2Cl2 at -78° and the solution was treated with ZrCl4 to room temperature to give Zr complex III. Polymerization of 0.75L propylene over 1.0 g methylaluminoxane (d.p. = 17.7) catalyst and 3.0 mg III as cocatalyst gave 8.0 g polypropylene.



ring nodes :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 20 22

ring bonds :

1-2 1-5 1-20 2-3 2-20 3-4 3-20 3-22 4-5 4-20 5-20 6-7 6-11 7-8 8-9 9-10 9-12 9-20
10-11 10-14 10-20 12-13 12-20 12-22 13-14 13-15 13-20 14-18 14-20 15-16 16-17 17-18

exact/norm bonds :

1-2 1-5 1-20 2-3 2-20 3-4 3-20 3-22 4-5 4-20 5-20 6-7 6-11 7-8 8-9 9-10 9-12 9-20
10-11 10-14 10-20 12-13 12-20 12-22 13-14 13-15 13-20 14-18 14-20 15-16 16-17 17-18

G1:Hf,Ti,Zr

G2:C,Si,Ge,Sn

Match level :

1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom 12:Atom
13:Atom 14:Atom 15:Atom 16:Atom 17:Atom 18:Atom 20:Atom 22:Atom